F&eIT Series

Micro Controller Unit

Windows XP Embedded Preinstall, model built in memory 256MB

CPU-SB22/256(FIT)

Windows XP Embedded Preinstall, model built in memory 256MB

CPU-SB21/256(FIT)GY

Corresponding to Windows XP/PC-DOS/Linux,
model built in memory 256MB

CPU-SB20/256(FIT)GY

Corresponding to Windows XP/PC-DOS/Linux,
model built in memory 128MB

CPU-SB20/128(FIT)GY

User's Manual

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.

The product consists of the items listed below.

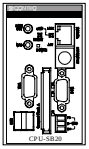
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List [CPU-SB22/256(FIT), CPU-SB21/256(FIT)GY]

- Module …1
- First step guide …1
- Power connector ...1
- Keyboard/mouse branch cable ...1
- Magnet ...2
- CompactFlash with Windows XP Embedded installed *1 … 1
- CD-ROM [F&eIT Series Setup Disk]*2 …1
- END USER LICENSE AGREEMENT FOR MICROSOFT SOFTWARE (Windows XP Embedded License Agreement) …1

*1 :With the 1GB CompactFlash In case of the CPU-SB22/256(FIT). With the 512MB CompactFlash In case of the CPU-SB21/256(FIT)GY

*2 : The CD-ROM contains various software and User's Manual (this manual)

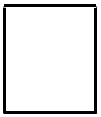

Module

Power connector

Magnet x 2

CD-ROM [F&eIT Series Setup Disk]

CompactFlash


First step guide

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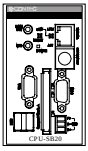
Keyboard/mouse branch cable

Product Configuration List [CPU-SB20/256(FIT)GY, CPU-SB20/128(FIT)GY]

- Module …1
- First step guide …1
- Power connector ...1
- Keyboard/mouse branch cable ...1
- Magnet ...2
- CD-ROM [F&eIT Series Setup Disk]*2 …1

*2 : The CD-ROM contains various software and User's User's Manual (this manual)

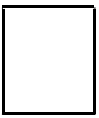

Module

Power connector

Magnet x 2

Keyboard/mouse branch cable

CD-ROM [F&eIT Series Setup Disk]


First step guide

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1. Before Using the Product

This section explains information you need to know about this product before you use it.

About the Module

This product is an ultra-small embedded controller that combines all the functions you need in a compact package. The module includes an expansion bus which you can use to add functions such as digital and analog I/O to your embedded controller by connecting other F&eIT series modules. Alternatively, the module can be used on its own as a standard PC.
The module is ideal if you require a system with low power consumption that can fit into a small space.

*1 The "x" in a model code represents a single digit (or no digit) indicating different products. (The same convention applies below).

Model:

CPU-SB22/256(FIT): Model with Windows XP Embedded pre-installed OS (CF:1GB)
CPU-SB21/256(FIT)GY: Model with Windows XP Embedded pre-installed OS (CF:512MB)
CPU-SB20/xxx(FIT)GY: Model which has no OS

Features

- Fits a PC with expansion capability into a very small size (52.4mm x 64.7mm x 94mm).
- The low-power 266MHz Geode SC2200 CPU can operate without a fan.
- Compact flash memory can be used for diskless operation.
- Equipped with AC97 compliant audio features
- Incorporates an expansion bus (connectable to F&eIT series modules).
- Like other F&eIT series products, the module has a 35mm DIN rail mounting mechanism as standard. The system features a unique configuration for its connection to a module on the side in a stacking manner, which allows you to configure the system simply and elegantly without using backplanes and other connecting devices.

Verified Operating Systems

Operating system for which the CPU-SB20/xxx (FIT)GY (Model which has no OS) operation has been confirmed is as follows.

- Microsoft Windows XP Professional, Embedded
- Microsoft Windows 2000 Professional
- Microsoft Windows Me
- Microsoft Windows 98 SE
- IBM PC-DOS 2000 Ver.7.0
- Linux 2.4.17Kernel

* Verified Operating Systems: Basic OS operation and VGA and LAN driver operation has been confirmed. CONTEC does not guarantee that all OS functions will operate correctly.

* You can build a Windows XP or Windows XP 2000 SP3/SP4 environment on the CPU-SB20/xxx(FIT)GY by installing the OS using a retail USB-based CD-ROM drive or FDD without using the DTK-SB20(FIT). You can also install another OS such as DOS if you prepare a retail USB CD-ROM drive supported by a startup disk for the OS.

Support Software

You should use CONTEC support software according to your purpose and development environment.

Driver library **API-SBP(W32)** (Available for downloading (free of charge) from the CONTEC web site.)

API-SBP(W32) is the library software that provides the commands for CONTEC hardware products in the form of Windows standard Win32 API functions (DLL).

It makes it easy to create high-speed application software taking advantage of the F&eIT module using various programming languages that support Win32 API functions, such as Visual Basic and Visual C++.

It can also be used by the installed diagnosis program to check hardware operations.

CONTEC provides download services (at http://www.contec.com/fit/page5.htm) to supply the updated drivers.

For details, refer to the driver's bundled help file or visit the CONTEC's Web site.

< Operating environment >

OS	Windows XP, 2000, Me, 98, etc..
Adaptation language	Visual C++, Visual Basic, etc..

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably. No driver software is provided with this module. Please download the latest drivers from the CONTEC web site (http://www.contec.co.jp/). Documents including important notes on the use of the module are also posted on the web site. Please visit the CONTEC web site before using the module.

Web Site

Japanese http://www.contec.co.jp/
English http://www.contec.com/
Chinese http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.

CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information
Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited Three-Years Warranty

CONTEC Interface modules are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to three years from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original modules. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Handling Precautions

⚠ DANGER

Please do not use the product in environments subject to flammable and corrosive gas. Otherwise, it can bring on exploding, fire, electric shock and trouble.

⚠ CAUTION

- Do not use or store the equipment in a hot or cold place, or a place that is subject to severe temperature changes.
  Examples: - Under direct sunlight
  - Near a heat source
- Do not use or store the equipment in a place that is subject to extreme humidity or dust. It will be extremely dangerous to use the equipment when its interior is contaminated with water or liquid, or conducting debris. When using the equipment in an environment that is subject to water or conducting debris, consideration should be given to the installation of a control panel with a structure that keeps dust out.
- Do not use or store the equipment in a place that is subject to shock or vibrations.
- Do not use or store the product near equipment generating a strong magnetic field or radio waves.
- Do not use or store the equipment in air with diffused chemicals or in an environment in which the equipment can come into contact with chemicals.
- When attaching or detaching a module or a connector, please be sure that the power cable for the system is unplugged from the outlet.
- Do not modify the unit. CONTEC will bear no responsibility for any problems, etc., resulting from modifying this unit.

- If you notice any malfunction or abnormal conditions (such or a strange odor or overheating), please unplug the power cord and consult either CONTEC's Information Center or the dealer from whom the system was purchased.
- To connect with peripherals, use a grounded, shielded cable.
- To clean the CPU-SBxx(FIT)GY, gently wipe it with a soft cloth soaked with water or a neutral detergent. Do not use benzene, a thinner, or other volatile solvents as they can cause the coating to discolor or peel off.
- Life of the components

  Battery ... A primary lithium battery is used to back up the internal clock/calendar and the CMOS RAM. When the power is not drawn and the battery is stored at 25°C, it will last over 6 years.

* The supply items can be replaced in the same manner as the repair of the system (chargeable).

FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

Environment

Use this product in the following environment. If used in an unauthorized environment, the module may overheat, malfunction, or cause a failure.

Operating temperature

0 - 50ºC

Operating humidity

10 - 90%RH (No condensation)

Corrosive gases

None

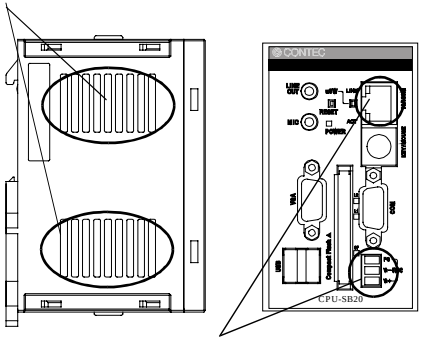
Floating dust particles

Not to be excessive

Inspection

Inspect the product periodically as follows to use it safely.

*The ventilation slits are not covered,
and neither dust nor alien substance is attached to the ventilation slits



*Make sure that the connectors on the module side are correctly connected with the cables

Storage

When storing this product, keep it in its original packing form.

(1) Put the module in the storage bag.
(2) Wrap it in the packing material, then put it in the box.
(3) Store the package at room temperature at a place free from direct sunlight, moisture, shock, vibration, magnetism, and static electricity.

Disposal

When disposing of the product, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

2. Hardware Setup

Getting Started

Follow the following procedures to set up the CPU-SB2x/xxx(FIT)xx:

STEP1 Connecting the F&eIT series module
By referring to this chapter connects the F&eIT series module to the CPU-SB2x/xxx(FIT)xx. When using the CPU-SB2x/xxx(FIT)xx on a standalone basis, go to STEP2.

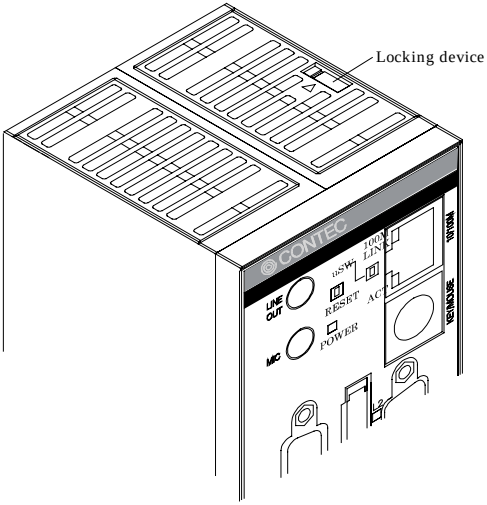
STEP2 Connecting the cables
Connect the cables for the CRT and other external devices to the CPU-SB2x/xxx(FIT)xx.

STEP3 Turning on the power
After re-checking that STEPS 1 to 2 have been correctly performed, turn on the power. If something goes wrong after the power is turned on, immediately turn off the power and make sure that the system is correctly set up.

Mounting the Module

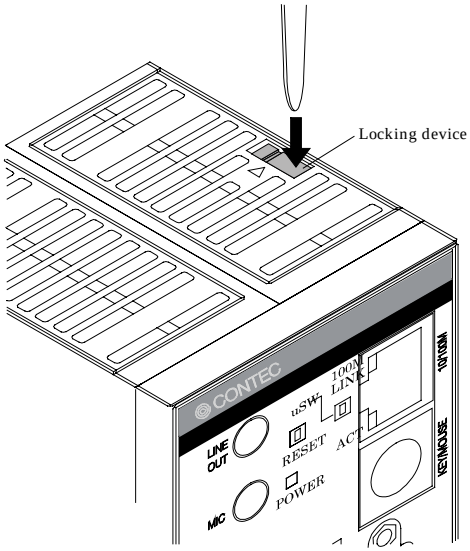
Stack Connection Locking Devices

The module contains connecting locking devices (▲mark, two units at the top and bottom).

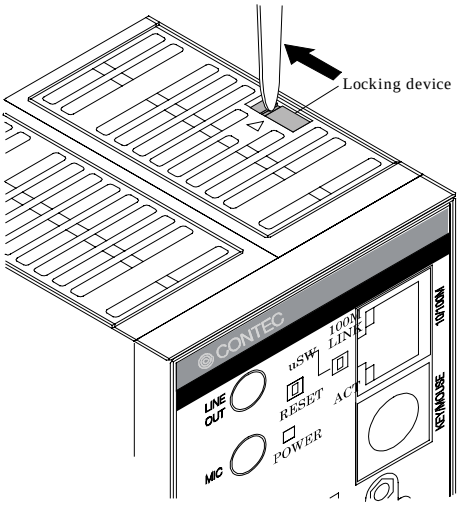


How the stack connection locking device works

- Locking
  Push the pawl of the locking device with a tool that has a slender tip downward from above to open the spring for the locking device
  (the groove moves toward you).

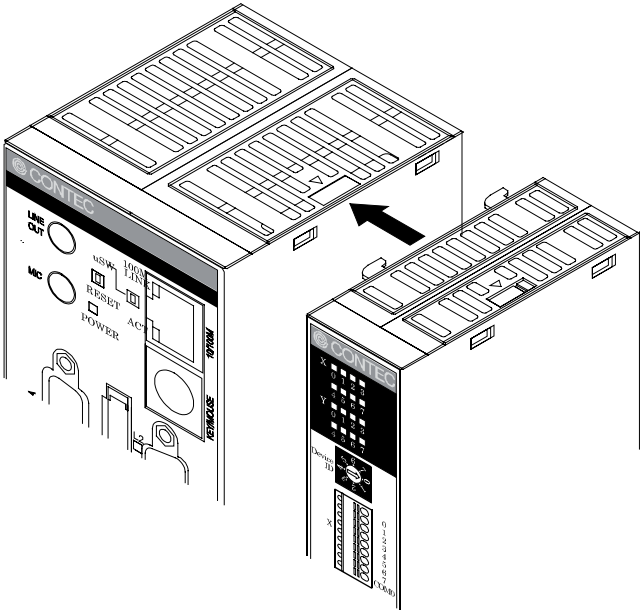


- Unlocking
  Push the groove of the locking device with a tool that has a slender tip in the direction of the arrow until the device is locked.



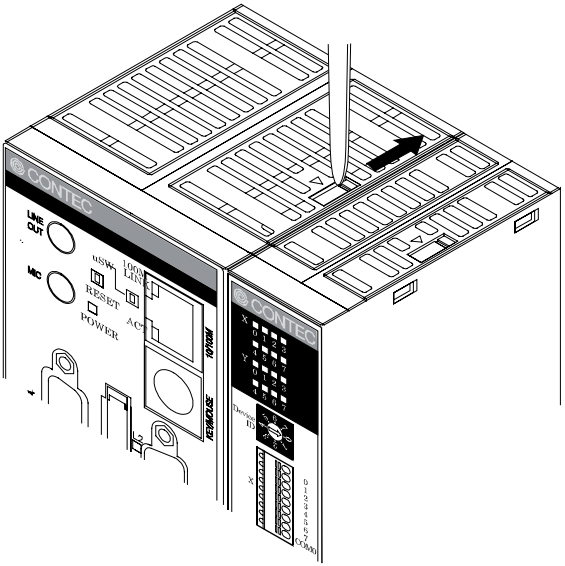
Connecting the module

Inserting the stack hook by aligning it with the hook insertion inlet for the other device automatically locks the module. (If a stack connector protective cover is attached, the connection operation should be performed after the cover is removed.)



Removing the module

Unlock the locking device at the top and the bottom. Remove the connected module from the hook.



Mounting on a DIN rail

Mounting procedure

(1) Pushing the fixing hook with a flat-blade screwdriver renders it into a lock-enabled condition (this should be done on all connected modules).

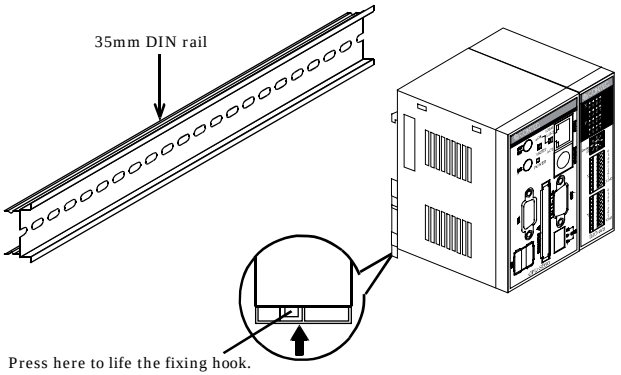


Figure 2.1. Mounting on a DIN rail ***< 1 / 3 >***

(2) Hook the unit (an object consisting of a controller and a module) from the upper part of the DIN rail, and press the lower part of the unit onto the DIN rail.

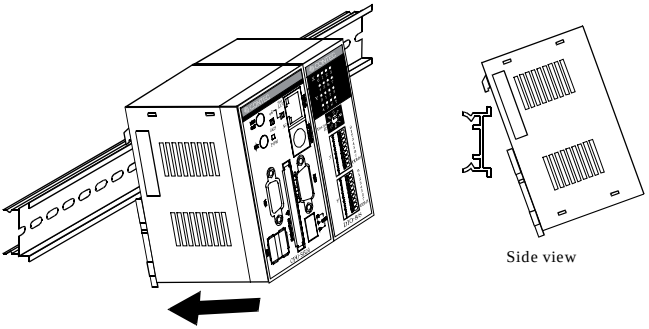


Figure 2.1. Mounting on a DIN rail ***< 2 / 3 >***

(3) The fixing hook is automatically locked, and the module can be mounted in one-touch.

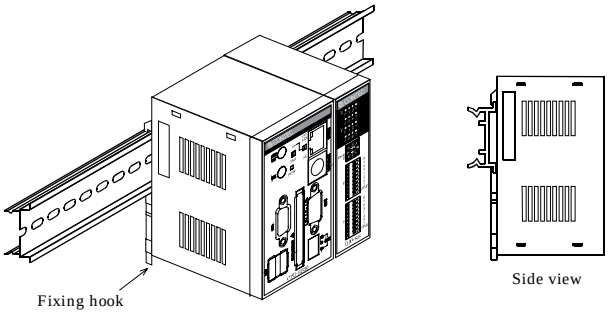


Figure 2.1. Mounting on a DIN rail ***< 3 / 3 >***

Removal procedure

(1) Lower the fixing hook for the unit to unlock it. (This operation should be performed on all connected modules.)

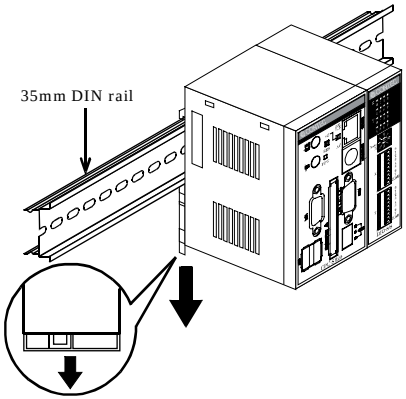


Figure 2.2. Removing the module from the DIN rail ***< 1 / 3 >***

(2) With the fixing hook unlocked, pull the lower part of the unit toward you.

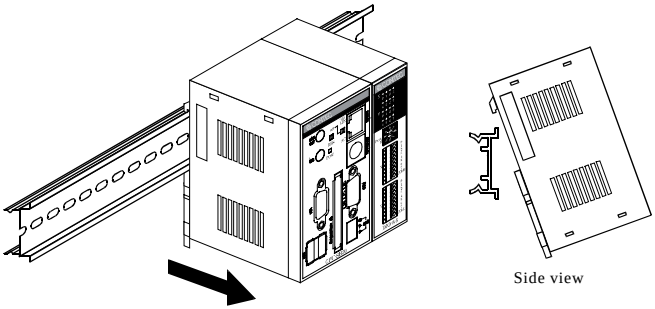


Figure 2.2. Removing the module from the DIN rail ***< 2 / 3 >***

(3) By lifting the unit, you can easily remove it from the DIN rail.

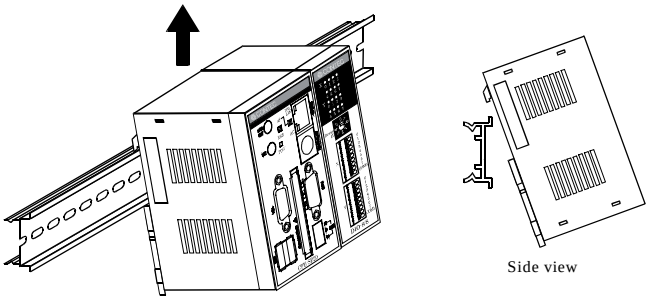


Figure 2.2. Removing the module from the DIN rail ***< 3 / 3 >***

⚠ CAUTION

Any operation involving the disconnection of modules in a unit (in which multiple modules are connected) that is attached to a DIN rail should be performed after the unit is removed from the DIN rail.

Connection Method

Supplying the Power to the Controller Module

(1) The DC-DC power supply unit and the controller module can be cable-connected using the detachable connector that is provided on either the unit face or module face . Use a cable no longer than 40cm (AWG24 to 16). (No longer than 15cm for AWG28 and no longer than 30cm for AWG26). (compatible cables: AWG 28 to 16). When connecting, remove approximately 7mm of insulation from the end of the cable
Apply a conductor tightening torque of 0.22 to 0.25 Nm.

⚠ CAUTION

The power supply for the device modules connected to the expansion bus is supplied via the stack connector.

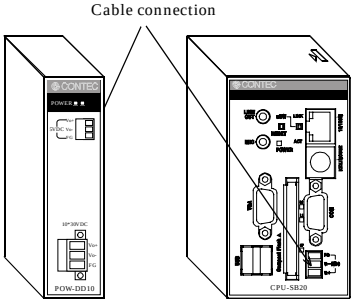


Figure 2.3. Connecting the controller module to the DC-DC power supply unit

Installation Conditions

The system can be installed in either orientation (1) or (2). Orientation (3), which does not lend itself to heat dissipation, should be avoided. A minimum clearance of 50 mm at the top and 10 mm on the sides should be provided between the system unit and any surrounding objects. If using orientation (1), do not connect any other modules. If using orientation (2), other modules may be connected but ensure a clearance on the bottom side of at least 20mm.

Installation orientation (stand-alone unit)

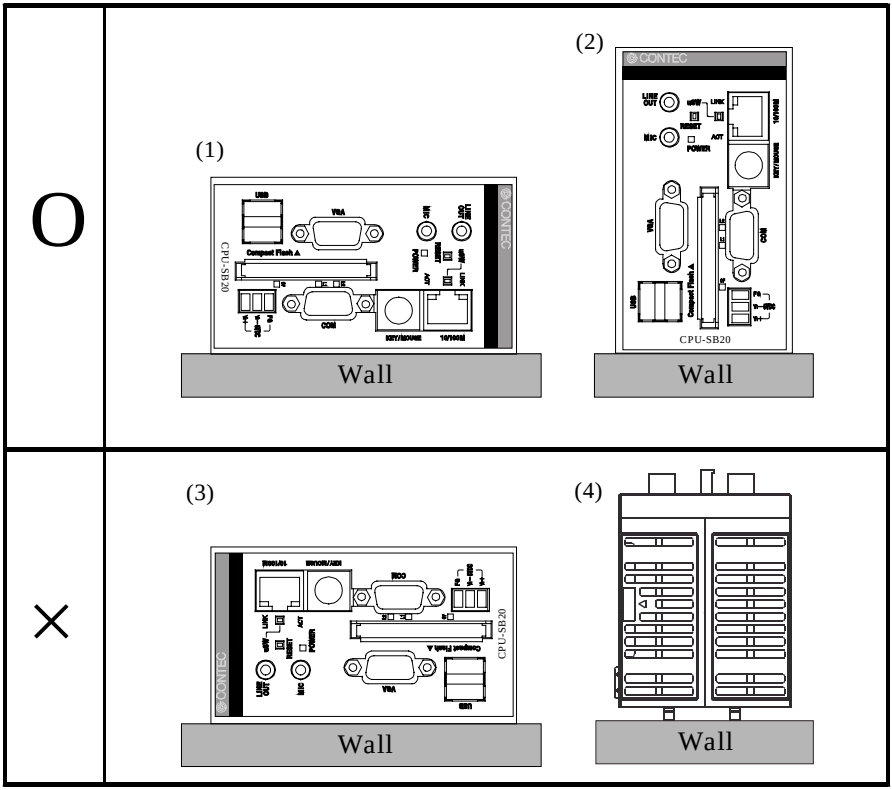


Figure 2.4. Installation orientation

Spacing between the system unit and any surrounding objects

Do not locate the module in a fully enclosed housing.

This restriction does not apply if the side of the enclosure has ventilation slits next to the module.

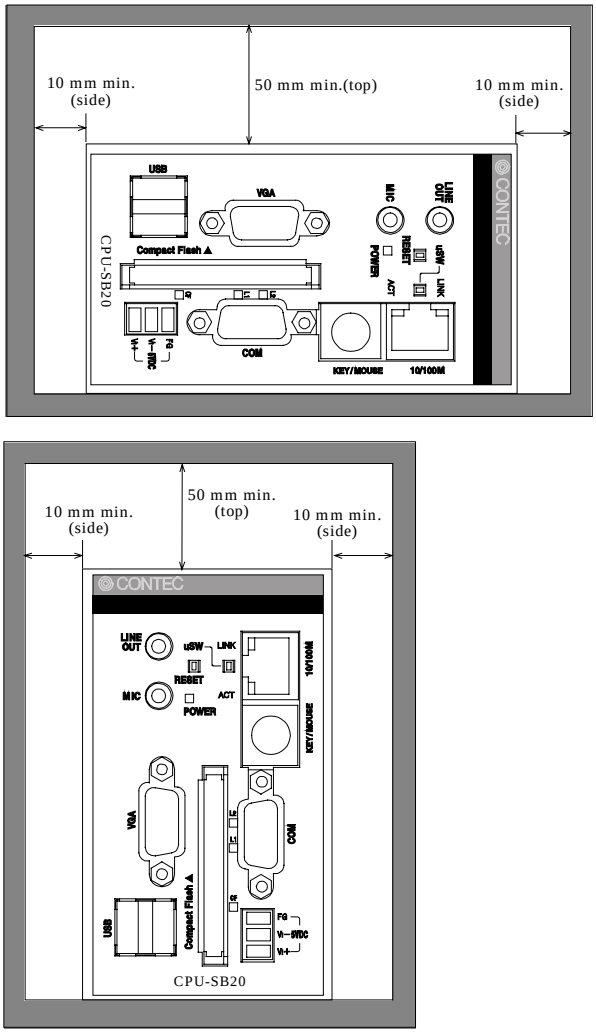


Figure 2.5. Spacing between the system unit and any surrounding objects

3. Functions of the Various Components

Nomenclature

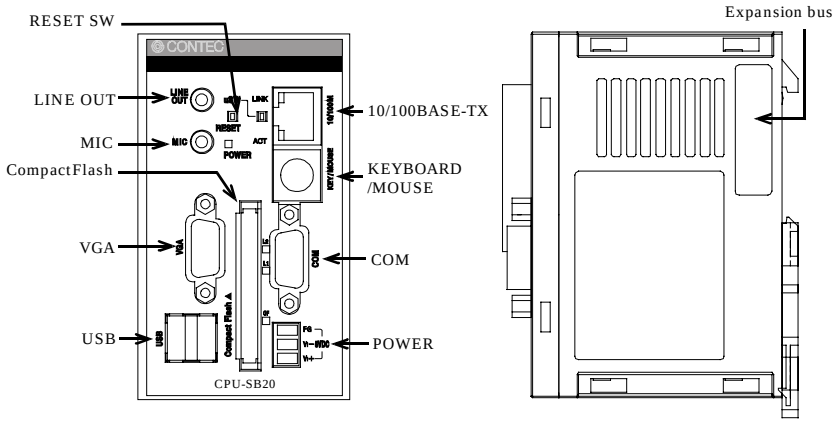


Figure 3.1. Nomenclature

Table 3.1. Functions of the various parts

Name	Function	Page
Keyboard/MOUSE	Keyboard/mouse connector (MINI-DIN 6-pin)	20
COM	Serial port connector (D-SUB 9-pin)	21
VGA	CRT connector (HD-SUB 15-pin)	28
CompactFlash	Compact FLASH insertion connector (TYPE 1 True IDE) Any microdrive or CompactFlash that supports True IDE mode can be used.	29
L1	User Programable LED1 : The LED can be turned on or off via IO port 8800H[0].	29
L2	User Programable LED2 : The LED can be turned on or off via IO port 8801H[0].	29
CF	Compact FLASH access verification LED	29
uSW	User Programable Switch The switch state (on or off) can be read from IO port 8802H[0].	29
RESET SW	Resets the CPU.	30
USB	USB connector (Type A)	30
LINE OUT	Line out (ϕ3.5 PHONE JACK)	32
MIC	Microphone input (ϕ3.5 PHONE JACK)	32
10/100BASE-TX	RJ-45 connector	31
Power	Power supply connector (MC1,5/3-G-3,5 PHOENIX CONTACT)	32
Expansion bus	F&eIT series connector (0.6mm pitch, 80-pin (FX-8C series, HIROSE))	32

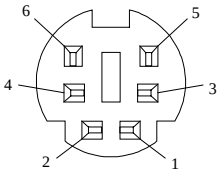
Keyboard/Mouse Interface

The system is equipped with a keyboard/mouse connector. The name of the connector is KEY/MOUSE (MINI-DIN 6P).

The keyboard and the mouse should be connected using a supplied branch cable. When the connector is inserted in the orientation indicated in the table below, the right cable is for the keyboard, and the left cable for the mouse.

If not using the branch cable, the interface can be used as a dedicated keyboard connector. This interface is disabled if a USB keyboard or mouse is used.

Table 3.2. Keyboard/mouse connector

Connector type	TCS7910-16-201 (Hoshiden) or equivalent		
			
Pin No.	Signal	Pin No.	Signal
1	+KBD DATA	5	+KBD CLK
2	+MOUSE DATA	6	+MOUSE CLK
3	GND	SHIELD	GND
4	+5.0V DC	---	

Serial Port Interface

RS-232C port (COM)

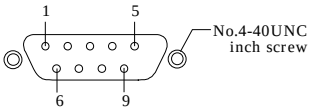
The system is equipped with one RS-232C-compliant serial port connector (serial port A: COM). This port can be set by means of BIOS setup procedures (Chapter 4).

Table 3.3. SERIAL1 I/O address and interrupt

COM	I/O address	Interrupt
1	3F8h-3FFh	IRQ 4

Table 3.4. Serial port connector

Connector used on the system unit	D-SUB 9 core (male)



Pin No.	Signal	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Dataset ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

I/O addresses and commands

The following table shows COM1 addresses and commands:

Table 3.5. I/O addresses

I/O address	DLAB	Read/Write	Register	
03F8h	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9h	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAh	X	R	Interrupt ID register	IIR
03FBh	X	W	Line control register	LCR
03FCh	X	W	Modem control register	MCR
03FDh	X	R	Line status register	LSR
03FEh	X	R	Modem status register	MSR
03FFh	X	R/W	Scratch register	SCR

DLAB (Divisor Latch Access Bit) : value of bit 7 of line control register

Table 3.6. Register functions ***< 1 / 4 >***

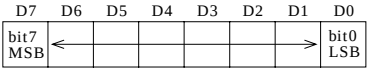
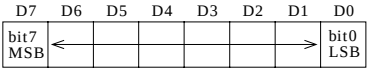
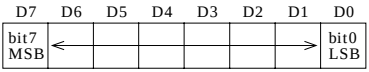
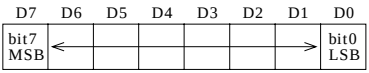
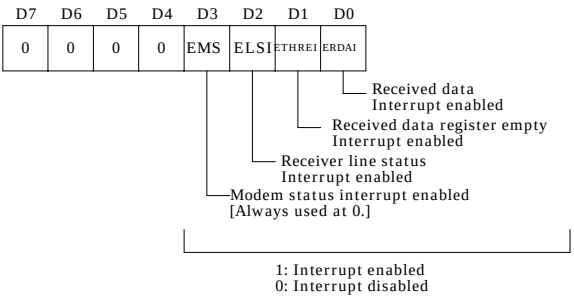
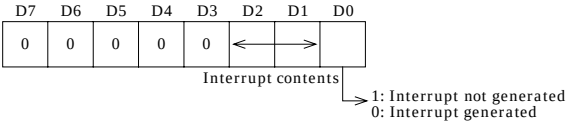
I/O address	Description
03F8h	THR: Transmitter Holding Register [DLAB=0]  Transmission data write-only register
03F8h	RBR: Reciever Buffer Register [DLAB=O]  Received data read-only register
03F8h	DLL: Divisor Latch (LSB) [DLAB=1]  Baud rate-setting register (LSB)
03F9h	DLH: Divisor Latch (MSB) [DLAB=1]  Baud rate-setting register (MSB)
03F9h	IER: Interrupt Enable Register [DLAB=0] 

Table 3.6. Register functions ***< 2 / 4 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAh</td><td>
IIR : Interrupt Identification Register


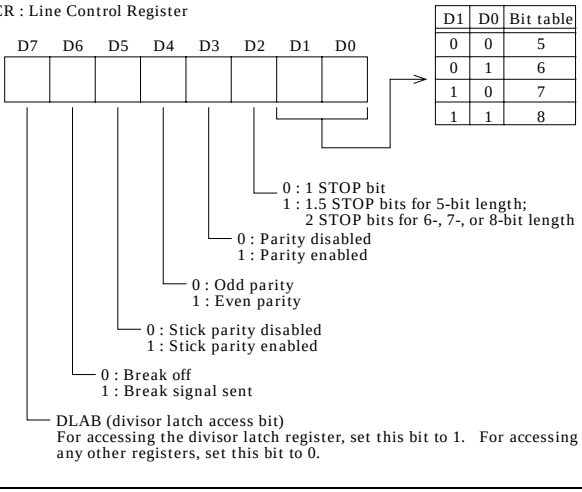
<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>No interrupts generated</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Interrupt generated on overrun, parity, framing error, or break. Interrupt cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Interrupt generated when the receive buffer register is ready. Interrupt cleared when the receive buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Interrupt generated when the transmitter holding register is empty. Interrupt cleared when the IIR is read or transmission data is written to the THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupts generated.(CTS, DSR, RI, CD) Interrupt cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBh</td><td>
LCR : Line Control Register

D7 D6 D5 D4 D3 D2 D1 D0
D1 D0 Bit table
0 0 5
0 1 6
1 0 7
1 1 8
0 : 1 STOP bit
1 : 1.5 STOP bits for 5-bit length;
2 STOP bits for 6-, 7-, or 8-bit length
0 : Parity disabled
1 : Parity enabled
0 : Odd parity
1 : Even parity
0 : Stick parity disabled
1 : Stick parity enabled
0 : Break off
1 : Break signal sent
DLAB (divisor latch access bit)
For accessing the divisor latch register, set this bit to 1. For accessing any other registers, set this bit to 0.
</td></tr>
</table>

Table 3.6. Register functions ***< 3 / 4 >***

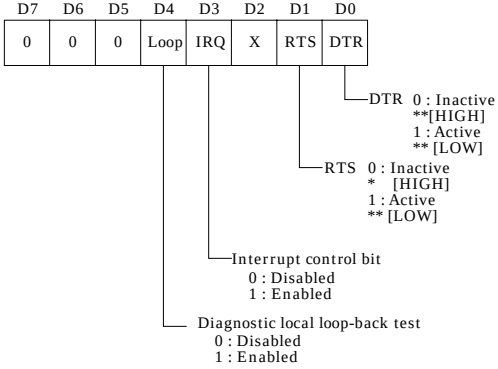
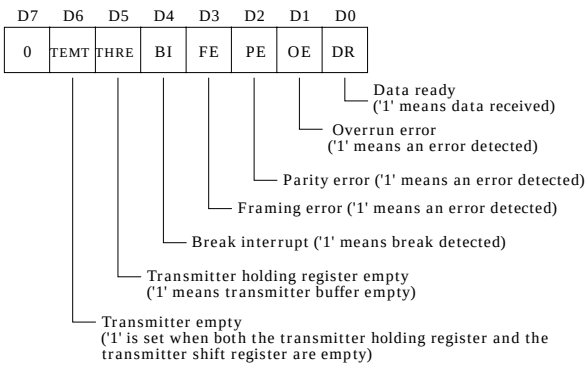
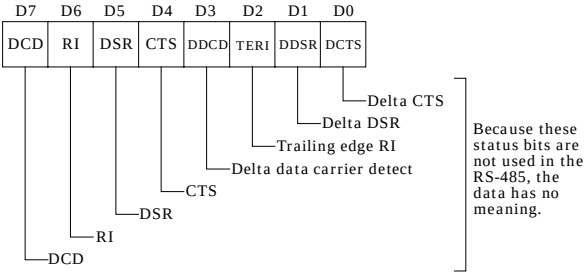
<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FCh</td><td>MCR: Modem Control Register
 
</td></tr>
<tr><td>03FDh</td><td>LSR: Line Status Register
 
</td></tr>
</table>

Table 3.6. Register functions ***< 4 / 4 >***

I/O address	Description
03FEh	MSR : Modem Status Register 
03FFh	SCR : Scratchpad Register This is an 8-bit data-saving register that is user-accessible for read and write operations.

Setting the Baud rate

Software sets the baud rate by dividing the clock input (1.8432MHz) by an appropriate factor. A baud rate can be set by writing one of the values listed in the table below into the Divisor Latch Register (LSB, MSB):

Table 3.7. Setting the Baud rate

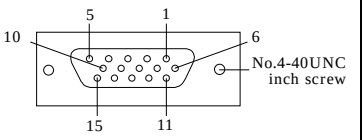
Baud rate to be set	et in divisor register	Error (%)
50	2304	0.16
75	1536	0.16
110	1047	0.19
134 .5	857	0.10
150	768	0.16
300	384	0.16
600	192	0.16
1200	96	0.16
1800	64	0.16
2000	58	0.53
2400	48	0.16
3600	32	0.16
4800	24	0.16
7200	16	0.16
9600	12	0.16
19200	6	0.16
28800	4	0.16
38400	3	0.16
57600	2	0.16
115200	1	0.16

Ex.: For a 9600bps setting, write 00 to divisor latch register (MSB), and 12 (dec.) to divisor latch register (LSB).

CRT Interface

The system is equipped with a connector for the CRT. The name of the connector is VGA(HD-SUB 15P).

Table 3.8. CRT connector

Connector type	15pin HD-SUB (MALE)		
			
Pin No.	Signal	Pin No.	Signal
1	RED	9	N.C.
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	N.C.
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	N.C.
8	GND		

CompactFlash Slot

A CompactFlash compliant card slot is provided. You can use TYPE I or TYPE II memory cards or microdrives that support True IDE mode. Also, you can boot the system from the CompactFlash (hereafter referred to as "CF") by inserting a card containing an operating system (MS-DOS, Windows, Linux, or similar). CONTEC recommends that you use the CONTEC DTK-SB20(FIT)GY to create the boot CF. The DTK-SB20(FIT) contains a CPU-SB20/128(FIT)GY together with a CD-ROM drive, hard disk, and FD drive.
Remember to format the CompactFlash card in the DTK-SB20(FIT)GY before installing the OS.
For formatting the CompactFlash card, use a USB-based FDD or the DTK-SB20(FIT)GY.
The CPU-SB21/256(FIT)GY has a 512-MB CF card plugged in the slot, in which Windows XP Embedded is already installed.
The CPU-SB22/256(FIT) has a 1-GB CF card plugged in the slot, in which Windows XP Embedded is already installed.

Power supply for the card

Available card voltages and current values for each slot are listed below:

Table 3.9. Power supply for the card

Voltage	Current (Max)
+5V	Not supplied
+3.3V	500mA
+12V	Not supplied

CF LED: Red

Illuminates when the CompactFlash is accessed.

Note that there is some variation between the specifications of CompactFlash cards. If you use a card with different specifications, the LED may not illuminate or may remain permanently illuminated.

POWER LED: Green

Illuminates when the power is turned on.

L1: User Programable LED1 Red

Writing "1" to bit 0 of IO port 8800H illuminates the L1 LED (red). Reading the IO port state is also permitted.

L2: User Programable LED2 Green

Writing "1" to bit 0 of IO port 8801H illuminates the L2 LED (green). Reading the IO port state is also permitted.

uSW: User Programable Switch

Reading bit 0 of IO port 8802H indicates the switch state. A value of "1" indicates the switch is pressed and "0" indicates no pressed. This IO port bit is read-only.

RESET SW

Pressing this button triggers a reset.

USB ports

Two OHCI Ver.1.0 compliant USB interface channels are provided.
When using USB devices, please check the current consumption of the devices to ensure the capacity of the power supply unit provided with the module is not exceeded.

The PS/2 keyboard or mouse is disabled with a keyboard or mouse connected to the USB port.

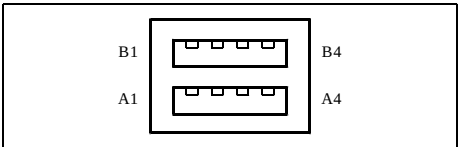
Although the module supports the use of a USB floppy disk drive (hereafter referred to as "FDD"), this cannot be used to boot from an MS-DOS, PC-DOS, or Windows Me boot disk. Booting from a Windows 95 or 98 boot disk or from a Windows 2000 or XP setup disk is supported.

Similarly, booting from a USB CD-ROM drive is not supported.

To install an OS from the USB CD-ROM drive, boot from the USB FDD and install the driver for the USB CD-ROM drive first. At this time, prepare a startup disk for Windows XP or Windows 2000 SP3 or later as it contains the USB CD-ROM driver, so that you can use the USB CD-ROM drive after booting from the startup disk. For any other OS, prepare a USB CD-ROM drive with a DOS driver provided and copy the DOS driver to a Windows 95/98 startup disk, so that the USB CD-ROM drive can be used.

For details on how to install the OS, visit to the CONTEC web site to download the “CPU-SBxx(FIT)GY OS installation procedure”.

Table 3.10. USB connector



Pin No.	Signal	Pin No.	Signal
A1	USB0 Vcc	B1	USB1 Vcc
A2	USB0 -Data	B2	USB1 -Data
A3	USB0 +Data	B3	USB1 +Data
A4	USB0 GND	B4	USB1 GND

Ethernet

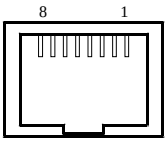
The CPU-SBxx(FIT)GY is equipped with a Fast-Ethernet card.

- Network mode: 100BASE-TX/10BASE-T
- Transmission rate* 100M/10M bps
- Max. network path length: 100m/segment
- Controller DP83815 or DP83816 (National Semiconductor)

* Operation at 100 Mbps requires a Category 5 cable.

Table 3.11. Ethernet connector

Connector type	RJ-45



Pin No.	Signal	Meamimg
1	TD+	Transmitted data (+)
2	TD-	Transmitted data (-)
3	RD+	Received data (+)
4	N.C.	Not connected
5	N.C.	Not connected
6	RD-	Received data (+)
7	N.C.	Not connected
8	N.C.	Not connected

Network status display LED:

100MLINK : Link status indicator

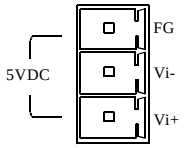
ACT : Data send/receive indicator

Visit the CONTEC web site to download the network driver for the OS running on your unit.

POWER

This is a power supply connector
- Power supply: 5.0V±5%

Table 3.12. Power supply connector

Connector type	MC1,5/3-G-3,5(PHOENIX CONTACT)	
		
Pin No.	Signal name	Meaning
1	FG	Frame ground
2	Vi-	Power supply (GND)
3	Vi+	Power supply (5V)

Applicable plug (provided with module): MC1,5/3-ST-3,5(Made by PHOENIX CONTACT) (For AWG28 - 16 cable)
The length of cable from the external power supply to the above connector must be no more than 40cm for AWG24 - 16 cable, no more than 15cm for AWG28, and no more than 30cm for AWG26.
When connecting, remove approximately 7mm of insulation from the end of the cable. Apply a conductor tightening torque of 0.22 - 0.25 Nm.

LINE OUT

The audio line OUT output. Plug type: ϕ3.5 pin jack
Stereo. Output level 8Ω 200mW. Signal to Noise ratio 90dB.

MIC

The audio MIC Input. Plug type: ϕ3.5 pin jack

Expansion Bus

This is a F&eIT series connector.

Table 3.13. Expansion bus connector

Connector type	FX8C-80S-SV(HIROSE)

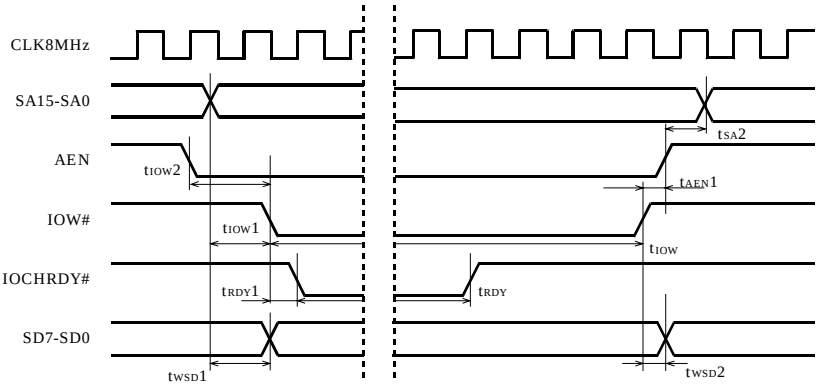
Available connector: FX8C-80P-SV (HIROSE)

Table 3.14. Expansion bus pin assignments

No.	Signal x86	Dir	Description	No.	Signal x86	Dir	Description
A01	FG		Frame ground	B01	FG		Frame ground
A02	N.C.		Not connected	B02	N.C.		Not connected
A03	SA15	OUT	Address bus 15	B03	SA14	OUT	Address bus 14
A04	SA13	OUT	Address bus 13	B04	SA12	OUT	Address bus 12
A05	SA11	OUT	Address bus 11	B05	SA10	OUT	Address bus 10
A06	SA09	OUT	Address bus 09	B06	SA08	OUT	Address bus 08
A07	SA07	OUT	Address bus 07	B07	SA06	OUT	Address bus 06
A08	SA05	OUT	Address bus 05	B08	SA04	OUT	Address bus 04
A09	SA03	OUT	Address bus 03	B09	SA02	OUT	Address bus 02
A10	SA01	OUT	Address bus 01	B10	SA00	OUT	Address bus 00
A11	RESERVED		Reserved	B11	RESERVED		Reserved
A12	RESERVED		Reserved	B12	RST_x86#	IN	CPU reset signal
A13	SD00	IN/OUT	Data bus 00	B13	SD01	IN/OUT	Data bus 01
A14	SD02	IN/OUT	Data bus 02	B14	SD03	IN/OUT	Data bus 03
A15	SD04	IN/OUT	Data bus 04	B15	SD05	IN/OUT	Data bus 05
A16	SD06	IN/OUT	Data bus 06	B16	SD07	IN/OUT	Data bus 07
A17	SD08	IN/OUT	Data bus 08	B17	SD09	IN/OUT	Data bus 09
A18	SD10	IN/OUT	Data bus 10	B18	SD11	IN/OUT	Data bus 11
A19	SD12	IN/OUT	Data bus 12	B19	SD13	IN/OUT	Data bus 13
A20	SD14	IN/OUT	Data bus 14	B20	SD15	IN/OUT	Data bus 15
A21	GND		Ground	B21	GND		Ground
A22	AEN	OUT	Address enable signal	B22	IOCHCK#	IN	NMI signal
A23	IOR#	OUT	Read signal	B23	IRQ7	IN	Interrupt signal
A24	IOW#	OUT	Write signal	B24	IRQ5	IN	Interrupt signal
A25	GND		Ground	B25	GND		Ground
A26	CLK8MHz	OUT	Bus clock	B26	IO_RST#	OUT	Reset signal
A27	GND		Ground	B27	CPUSEN	OUT	CPU ID
A28	IOCHRDY#	IN/OUT	Wait signal	B28	GND		Ground
A29	GND		Ground	B29	GND		Ground
A30	RESETDRV		ISA RESETDRV signal	B30	RESERVED		Reserved
A31	IRQ9	IN	Interrupt signal	B31	RESERVED		Reserved
A32	RESERVED		Reserved	B32	RESERVED		Reserved
A33	SBHE	IN/OUT	ISA SBHE signal	B33	IOCS16#	IN	ISA IOCS16 signal
A34	RESERVED		Reserved	B34	RESERVED		Reserved
A35	RESERVED		Reserved	B35	RESERVED		Reserved
A36	RESERVED		Reserved	B36	RESERVED		Reserved
A37	VCC		+5.0V power supply	B37	VCC		+5.0V power supply
A38	VCC		+5.0V power supply	B38	VCC		+5.0V power supply
A39	VCC		+5.0V power supply	B39	VCC		+5.0V power supply
A40	VCC		+5.0V power supply	B40	VCC		+5.0V power supply

⚠ CAUTION

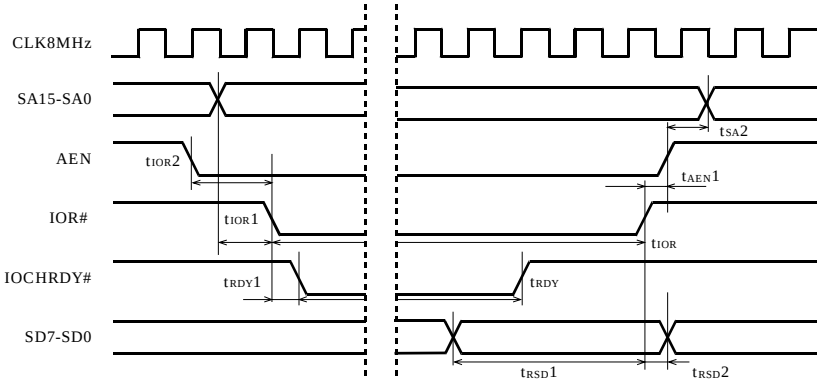
The symbol "#" at the end of an item represents negative logic. In an I/O module, normally a pin is reset by using pin B26 IO_RST#. The signal B27 CPUSEN indicates a Low level output. The IRQx signal represents a signal for which the rise edge is enabled. Total power ratings for the power supply pins: 5.0VDC, 3.0A.



[ns]

Item	Code	Min.	Max.
Address delay time	tSA2	0	-
AEN delay time 1	tAEN2	30	-
IOW# delay time 2	tIOW2	100	-
IOW# delay time 1	tIOW1	100	-
IOW# pulse width	tIOW	16bit-225 8bit-520	-
IOCHRDY# delay time	tRDY1	-	16bit-75 8bit-360
IOCHRDY# pulse width	tRDY	125	15600
Data delay time	tWSD1	16bit-123 8bit-140	-
Data hold time	tWSD2	45	-

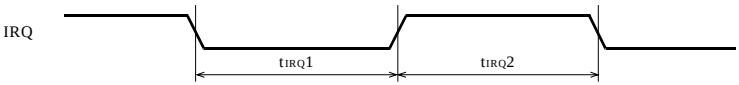
Figure 3.2. Expansion bus I/O write cycle



[ns]

Item	Code	Min.	Max.
Address delay time	tSA2	0	-
AEN delay time 1	tAEN1	30	-
IOW# delay time 2	tIOR2	100	-
IOW# delay time 1	tIOR1	100	-
IOW# pulse width	tIOR	16bit-160 8bit-520	-
IOCHRDY# delay time	tRDY1	-	16bit-75 8bit-360
IOCHRDY# pulse width	tRDY	125	15600
Data setup time	tRSD1	24	-
Data hold time	tRSD2	45	-

Figure 3.3. Expansion bus I/O read cycle



Item	Code	Min.	Max.
Recovery time	tIRQ2	125	-
Data hold time	tIRQ2	*1	*1

*1 Hi level until the interrupt is complete

Figure 3.4. Expansion bus interrupt cycle

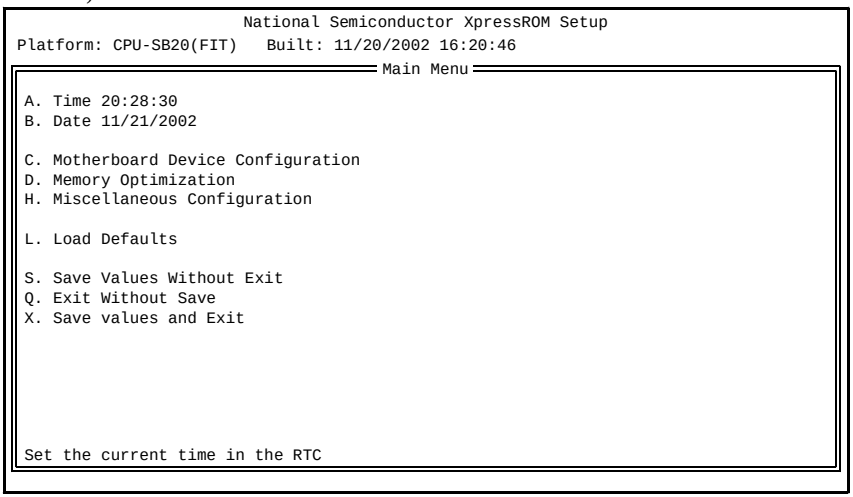
4. BIOS Setup

BIOS Setup

The BIOS setup is used to configure a range of settings for booting. Use the BIOS setup to reset the date and time or modify resource settings. You also need to modify the settings if you wish to use IRQ5 on the expansion bus.

Launching the Setup Screen

Pressing the F1 key when you turn on the power displays the setup screen.
(Check the LEDs on the keyboard such as [Num-Lock], [Caps Lock], and [Scroll Lock] and press the F1 key three or four times immediately after the LEDs blink twice except immediately after the power is turned on.
The F1 key might not be notified when the keyboard switch container is used and the setup screen not be displayed. Please remove the keyboard switch container when you cannot display the setup screen and work.)



Keys and their functions

At the time of setup, the keys have the following functions that can be used:

Table 4.1. List of keys and functions

Key	Function
↑, ↓	Moves settings.
+ , -	Changes the setting value.
<Enter>	Opens a sub-menu.
<Esc>	Goes back to parent screen.

Setting Item Tree

Time	Sets the time
Date	Sets the date
Motherboard Device Configration	
Drive Configration	Specifies IDE drive settings.
IDE BIOS Support	Always set to "Enable".
Chipset IDE Channel	Always set to "Both".
PIO mode setup	Sets the data transfer speed in PIO mode for the CompactFlash slot. Modes 0 to 4 specify increasingly faster speeds. Check the specifications of the CompactFlash you are using and set an appropriate value.
DMA/UDMA support	As this module does not support IDE DMA, always set to "Disable".
CD-ROM Boot Configration	This setting is not used on this module.
Boot Order Configration	Sets the priority order for booting. On this system, "Hard Drive #1" corresponds to the CompactFlash slot.
LPC Card Devices	
Serial Port	Sets the COM port resources.
FDC	Always set to "Disable".
Audio Configration	
Audio Enable	Enables or disables audio support.
Audio Base	Always set to "0x220".
Audio IRQ	If audio support is enabled, always set this to IRQ5.
Audio 8bit DMA	Always set to "Channel 1".
Audio 16bit DMA	Always set to "Channel 5".
Video Configration	Sets the video RAM settings. Always set to "4MB".
PCI Configration	Sets the PCI interrupt routing.
Memory Optimization	Sets the memory timing. As setting an incorrect value may prevent the system from booting, ensure this is always left at the factory default setting.
Miscellaneous Configration	
Splash Screen Configration	The Splash Screen is the CONTEC logo displayed when the power is turned on.
Splash Screen	Specifies whether or not to display the CONTEC logo when the power is turned on.
Clear Splash Screen	If set to "Enable", pressing a keyboard key while the CONTEC logo is displayed clears the screen.
Splash Screen Timeout	Specifies how long to display the logo.
Summary Screen Configration	The Summary Screen is displayed after the Splash Screen and displays system information (memory size, IDE device information, etc.)
Summary Screen	Specifies whether or not to display system information when the power is turned on.
Summary Screen Timeout	Specifies how long to display the system information.
Load Defaults	Restores all settings except the date and time to their factory default settings.
Save Values Without Exit	Saves the settings.
Exit Without Save	Reboots the system without saving the settings.
Save values and Exit	Saves the settings and then reboots the system.

When Using IRQ5 on the Expansion Bus

The audio function on the module is only able to use IRQ5. Accordingly, the default factory settings assign IRQ5 to the audio function and using IRQ5 on the expansion bus results in a conflict.

If you want to use IRQ5 on the expansion bus, please change the following settings.

- In the PCI Configuration, set INTC to "Disable".
- In the Audio Configuration, set Audio IRQ to "Disable".

When COM-2(FIT)GY is used with Windows, I will recommend an enhanced mode attached CD-ROM driver to use IRQ7 or IRQ9.

5. Specifications

Specifications

Table 5.1. Functional Specifications

Model		CPU-SB22/256(FIT) CPU-SB21/256(FIT)GY CPU-SB20/256(FIT)GY	CPU-SB20/128(FIT)GY
CPU		Geode SC2200 266MHz	
Chip Set		Built-in CPU	
Memory	Main Memory	Micro-DIMM Socket x 1 Standard provides 256Mbyte Micro-DIMM	Micro-DIMM Socket x 1 Standard provides 128Mbyte Micro-DIMM
	BIOS ROM	128KByte E0000h to FFFFFh	
Video	Controller	Built-in CPU	
	Video RAM	4MByte equivalent	
	CRT I/F	15pin HD-SUB connector 640 x 480/800 x 600 (65,536 colors), 1024 x768 (65,536 colors), 1280 x1024 (256 colors)	
Serial I/F		RS-232C (generic): 1ch, 9pin D-SUB connector	
LAN I/F		Ethernet 100BASE-TX/10BASE-T RJ-45 connector DP83815 or DP83816 (National Semiconductor)	
Audio I/F		Output: Line OUT x 1(Stereo. Output level 8Ω 200mW. Signal to Noise ratio 90dB.), Input: MIC x 1(Monaural), Plug type: φ3.5 pin JACK	
USB I/F		2ch(OHCI Ver.1.0 compliant)	
Keyboard I/F		PS/2 type keyboard (6 pins, MINI DIN connector)	
Mouse I/F		PS/2 type mouse (6 pins, MINI DIN connector)	
F&eIT I/F		F&eIT series module connectivity (When using POW-DD10 power supply unit, the total power for externally connected units. Should not exceed 1.5 A)	
Watchdog timer function		Programmable (16666sec(Max.)) (Output to either RESET or IRQ, depending on time-up)	
Compact Flash Slot		TYPE I or TYPE II x 1 The CPU-SB22/256(FIT) comes standard with a 1-GB CF card with Windows XP Embedded installed. The CPU-SB21/256(FIT)GY comes standard with a 512-MB CF card with Windows XP Embedded installed.	
RTC/CMOS		Life of lithium backup battery: 6 yr. minimum (25°C) Accuracy of realtime clock: less than 3 min./month	
LED display		Power, Compact Flash access, User programmable LED x 2	
Manual switch input		Reset switch x 1, User programmable switch x 1	
Power supply	Input power voltage	5VDC ±5%	
	Max. power consumption	7.5W	
External dimensions (mm)		52.4(W) x 64.7(D) x 94.0(H)	
Weight		300g	

Table 5.2. Installation environment

Parameter		Requirement description
Operating temperature *1		0 - 50°C
Storage temperature		-10 - 60°C
Operating Humidity		10 - 90%RH (No condensation)
Floating dust particles		Not to be excessive
Corrosive gases		None
Line-Noise resistance	Line-noise *2	AC line/2kV, Signal line/1kV (IEC1000-4-4Level 3, EN61000-4-4Level 3)
	Static electricity resistance	Contact discharge/4kV (IEC1000-4-2Level 2, EN61000-4-2Level 2)
		Atmospheric discharge/8kV (IEC1000-4-2Level 3, EN61000-4-2Level 3)
Vibration resistance	Sweep resistance	10 - 57Hz/semi-amplitude 0.15mm, 57 - 150Hz/2.0G
		80minutes each in X, Y, and Z directions (JIS C0040-compliant, IEC68-2-6-compliant)
Impact resistance		15G, half-sine shock for 11ms in X, Y, and Z directions (JIS C004-compliant, IEC68-2-27-compliant)
Grounding		Class D grounding (previous class 3 grounding)

*1 The operating temperature range changes to 5 - 60ºC if a FAN unit (FAN-FIT) is used.

*2 In POW-AD22GY use.

System Configuration

Example System Configurations

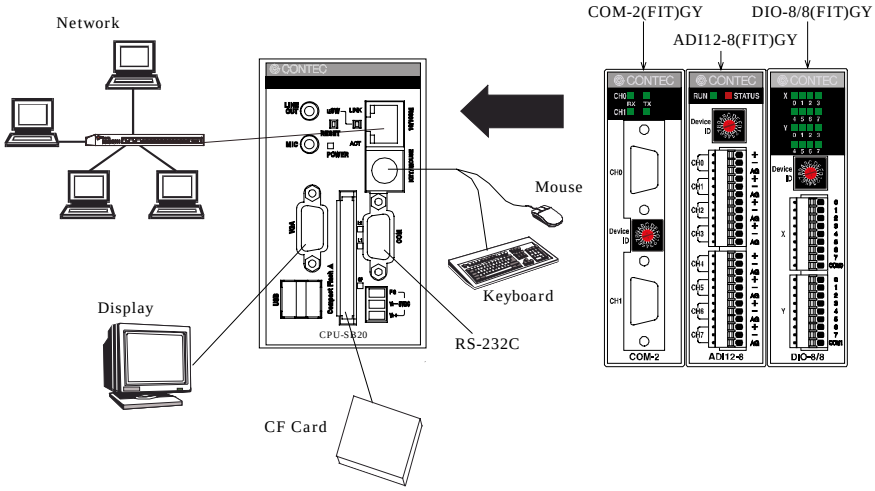


Figure 5.1. System configuration diagram

External Dimensions

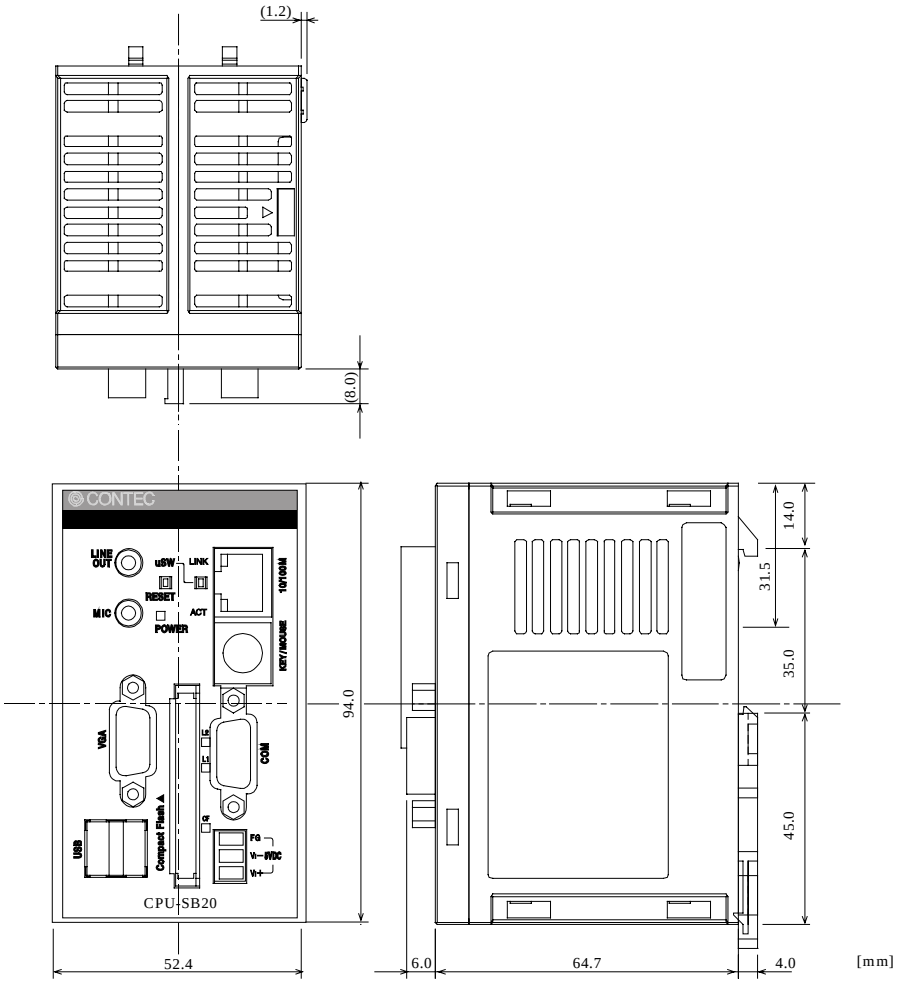


Figure 5.2. External Dimensions

6. Appendix

Watchdog Timer

A watchdog function is provided as a failsafe mechanism for the case when the system hangs up.

When the watchdog function is triggered, it notifies the system via an interrupt or system reset.

The base IO address for the watchdog function is 9000h.

Table 6.1. Registers

Abbreviation	Contents	Bit position
WDTO	Timeout register	Offset 00-01h
WDOVF	Overflow	Offset 04h[0]
WDPRES	32KHz clock prescaler	Offset 02h[3:0]
WD32KPD	32KHz clock enable/disable bit	Offset 02h[8]
WDTYPE1	Specifies the operation when the watchdog timer counts down to zero (for the first time).	Offset 02h[5:4]
WDTYPE2	Specifies the operation when the watchdog timer counts down to zero (for the second time).	Offset 02h[7:6]

Notation: Offset XXh[YY] indicates bit YY at 90XXh.

Writing a non-zero value to WDTO (timeout register (offset 00h)) enables the watchdog.

Table 6.2. Watch dog timeout value

offset 00-01h

Bit	Contents
15:0	Watch dog timeout value

The watchdog timer is a 16-bit down counter.

The watchdog timer counts down until the count reaches zero.

The watchdog timer restarts in the following cases.

- A non-zero value is written to WDTO.
- The watchdog timer reaches zero and WDOVF is "0".

The watchdog function does not operate in the following cases.

- When a system reset occurs
- When zero is set to the WDTO register.
- When the timer reaches zero and the WDOVF bit is already "1".

Setting table of a watch dog

Table 6.3. Watch dog configuration table

Offset 02-03h

Bit	Contents
15:9	Reserved Read and then write back.
8	32KHz Clock enable flag 0:32KHz Clock enable flag 1:32KHz Clock disable flag
7:6	WATCHDOG Event Type 2 00:No operation 01:Interrupt 11: System reset
5:4	WATCHDOG Event Type 1 00: No operation 01: Interrupt 11: System reset
3:0	WATCHDOG Timer Prescaler 0000:1 0100:16 1000:256 1100:4096 0001:2 0101:32 1001:512 1101:8192 0010:4 0110:64 1010:1024 1110:Reserved 0011:8 0111:128 1011:2048 1111:Reserved

A value of "0" in WD32KPD (offset 02h [8]) enables the 32KHz clock. A value of "1" disables the clock and therefore disables the watchdog function.

The clock input to the watchdog function is the 32.768KHz clock divided by the value set in WDPRES (offset 02h [3:0]).

Watchdog interrupt interval (sec) = Timeout (WDTO) x Prescaler (WDPRES) ÷ 32768(32KHz)

Table 6.4. Example of a setting

WDPRES Prescaler	WDTO Timeout register	Timeout time (sec)
1	32768	1
1	16384	0.5
1	8192	0.25
2	32768	2
2	16384	1
2	8192	0.5

When the watchdog timer reaches zero:

- If the WDOVF (offset 04h [0]) bit is "0", the interrupt or reset specified by WDTYPE1 (offset 02h [5:4]) is generated.
- If the WDOVF (offset 04h [0]) bit is "1", the interrupt or reset specified by WDTYPE2 (offset 02h [7:6]) is generated and the timer is disabled.
  Writing a non-zero value to the WDTO register re-enables the watchdog timer.

When watchdog event type is set to generate an interrupt, you can select the interrupt number.

Table 6.5. Interrupt Number Selection

Offset 38h

Bit	Contents
7:4	Reserved Writing after reading
3:0	Interrupt setting table 0101:IRQ5 0111:IRQ7 1001:IRQ9

To use an interrupt, you must enable the interrupt at base address 6600h. To use IRQ5, you also need to use the BIOS Setup to set INTC to "Disable" in the PCI Configuration. As the audio function uses INTC-IRQ5, the IRQ5 output from the audio function and watchdog will conflict.

Setup as shown in the table below.

Table 6.6. Interrupt Enable Settings

IRQ	Output data
IRQ5	12d2h
IRQ7	1272h
IRQ9	10f2h

You can retrieve the current watchdog status.

Table 6.7. Watch dog status

Offset 04h

Bit	Contents
7:4	Reserved
3	WATCHDOG reset occurred (read-only) Set to "1" when a reset interrupt is generated. Cleared by a power-on reset or by writing "0" to the WDOVF bit.
2	WATCHDOG SMI(read-only) Not supported
1	WATCHDOG Interrup (read-only) Set to "1" when an interrupt is generated. Cleared by a power-on reset or by writing "0" to the WDOVF bit.
0	WDOVF flag (read, write) Set to "1" when an the watchdog timer counts down to zero. Cleared by a power-on reset or by writing "1" to this bit.

Sample program

```
/*************************************************************************
          Sample program
*************************************************************************/
#include <stdio.h>
#include <conio.h>
#include <dos.h>
#include <bios.h>
#include <time.h>
/* ----- Constant ------------------------------------------------------ */
#define NUM (5)
#define WDBASE 0x9000
#define   IRQ5               0         /* IRQ5 */
#define   IRQ7               1         /* IRQ7 */
#define   IRQ9               2         /* IRQ9 */
int paraIrq;
unsigned int paraPrescaler;
unsigned int paraPrescalerBit;
unsigned int paraCount;
volatile  int       intcnt = 0;                  /* interrupt counter */
volatile  int       IrqLevel = IRQ7;             /* interrupt level */
          int       OrgMasterImr, OrgSlaveImr;             /* original IMR */
unsigned char       IntVector[3] = { 0x0d, 0x0f, 0x71 };    /* interrupt vector */
unsigned char       PicMask[3] = { 0xdf, 0x7f, 0xfd };     /* mask bit */
unsigned char       IsrClear[3] = { 0x65, 0x67, 0x61 };    /* ISR clear */
/* ----- Prototype ----------------------------------------------------- */
void      main( int, char *[] );
void      ChgVect( void );                                 /* change vector */
void      ResVect( void );                                 /* restore vector */
void      _interrupt _far inthandler( void );            /* interrupt handler */
void      ( _interrupt _far *OrgVect)();          /* original interrupt vector */
/* ----- change vector ------------------------------------------------- */
void      ChgVect( void ){
          OrgVect = _dos_getvect( IntVector[IrqLevel] );
          _disable();
          _dos_setvect( IntVector[IrqLevel], inthandler );
```

```
        if ( IrqLevel > IRQ7 ) {                    /* IMR and mask clear */
                outp( 0x21, ( OrgMasterImr = inp( 0x21 ) ) & 0xfb );
                outp( 0xa1, ( OrgSlaveImr = inp( 0xa1 ) ) & PicMask[IrqLevel] );
                outp( 0x20, 0x62 );                 /* ISR clear (master) */
                outp( 0xa0, IsrClear[IrqLevel] );   /* ISR clear (slave) */
        } else {
                                                    /* IMR and mask clear */
                outp( 0x21, ( OrgMasterImr = inp( 0x21 ) ) & PicMask[IrqLevel] );
                outp( 0x20, IsrClear[IrqLevel] );       /* ISR clear */
        }
        _enable();                                      /* enable */
}
/* ----- restore vector ---------------------------------------------------- */
void    ResVect( void ){
        _disable();                                     /* disable */
        if ( IrqLevel > IRQ7 ) {                        /* restore IMR */
                outp( 0x21, OrgMasterImr );
                outp( 0xa1, OrgSlaveImr );
        } else
                outp( 0x21, OrgMasterImr );
        _dos_setvect( IntVector[IrqLevel], OrgVect );   /* restore orgvect */
        _enable();                                      /* enable */
}
void wdt_init(){
        unsigned int setVal;
        unsigned char setValc;
        setValc=inp(WDBASE+0x4);
        setValc|=0x1;                           /* WDOVF set 1 */
        outp(WDBASE+0x4, setValc);
        setValc=inp(WDBASE+0x38);     /* General Configuration Block */
        setValc&=0xf0;
        setValc|=(paraIrq & 0xf );    /* IRQ set */
        outp(WDBASE+0x38, setValc);
        setVal=inp(WDBASE+2);         /* WATCHDOG Configuration Register */
        setVal&=0xfe00;
        setVal|=0xc0; /* WTYPE2 0xc0:System reset 0x40:Interrupt 0x00:No action */
        setVal|=0x10; /* WTYPE1 0x30:System reset 0x10:Interrupt 0x00:No action */
```

```
        setVal|=paraPrescalerBit;
        outpw(WDBASE+2, setVal );    /* WATCHDOG Configuration Register */
}
/* ----- interrupt handler ---------------------------------------------- */
void    _interrupt _far inthandler( void ){
        unsigned int setVal;
        _enable();                          /* enable */
        intcnt++;
        _disable();                         /* disable */
        wdt_init();
        outpw(WDBASE+0, 0 );                /* WATCHDOG stop */
        if( IrqLevel > IRQ7 ){              /* EOI */
                outp( 0xa0, 0x20 );
                outp( 0xa0, 0x0b );
                        if ( !inp( 0xa0 ) ) outp( 0x20, 0x20 );
        } else  outp( 0x20, 0x20 );
}
void paraError(char *para){
        printf( "Unknown parameta[%s]¥n¥n", para );
        printf( "usage: itr-test [-I:irq] [-S:32kPrescaler] [-C:counter]¥n" );
        printf( "            -I:5,7,9¥n" );
        printf( "            -S:1,2,4,....,1024,2048,4096,8192¥n" );
        printf( "            -C:1,...,65535¥n" );
        exit(1);
}
void showPara(){
        printf( "Program start¥n" );
        printf( "IRQ=%d¥n", paraIrq );
        printf( "32KHz prescale=%d¥n", paraPrescaler );
        printf( "Count=%u¥n", paraCount );
}
/* ----- main ----------------------------------------------------------- */
/* parameta check */
/* -I:irq <5,7,9> */
/* -S:99  <32k Prescaler><1,2,4,8,16,32,64,128,256,512,1024,2048,4096,8192> */
/* -C:99           <counter><1-65535> */
/* default */
```

```
/* IRQ=7, 32k Prescaler=4096, Count=16 */
void main( int argc, char *argv[] ){
          unsigned int setVal;
          unsigned int       i, j;
          unsigned char c;
          int wintcnt = 0;
          paraIrq=7;
          paraPrescaler=4096;
          paraPrescalerBit=0xc;
          paraCount=16;
          for(i=1;i<argc;i++){
                    if( memcmp( argv[i], "-I:", 3 )==0 ){        /* set irq */
                              int wirq=atoi(&argv[i][3]);
                              if( wirq==5 )IrqLevel=IRQ5;
                              else if( wirq==7 )IrqLevel=IRQ7;
                              else if( wirq==9 )IrqLevel=IRQ9;
                              else paraError(argv[i]);
                              paraIrq=wirq;
                    }else if( memcmp( argv[i], "-S:", 3 )==0 ){/* set Prescaler */
                              int wcnt=1;
                              int wscale=atoi(&argv[i][3]);
                              paraPrescalerBit=0;
                              while(1){
                                        if( wcnt==wscale ){
                                                  paraPrescaler=wcnt;
                                                  break;
                                        }
                                        wcnt *=2;
                                        paraPrescalerBit++;
                                        if( wcnt>8192 )paraError(argv[i]);
                              }
                    }else if( memcmp( argv[i], "-C:", 3 )==0 ){
                              paraCount=atoi(&argv[i][3]);
                              if( paraCount<1 )paraError(argv[i]);
                    }else paraError(argv[i]);
          }
          showPara();
```

```
        setVal=inpw(0x6600);                                /* lpc to isa set */
        printf( "in 0x6600=[%x]¥n", setVal );
        if( IrqLevel==IRQ5 )setVal&=0xffdf;
        else if( IrqLevel==IRQ7 )setVal&=0xff7f;
        else if( IrqLevel==IRQ9 )setVal&=0xfdff;
        printf( "out 0x6600=[%x]¥n", setVal );
        outpw(0x6600, setVal );                             /* lpc to isa set */
        wdt_init();
        ChgVect();                                          /* change vector */
        outpw(WDBASE+0, paraCount );  /* WATCHDOG Timeout Register */
        while( intcnt <= NUM ){
                if( wintcnt!=intcnt ){
                        printf("interrupt count = %02d>¥n", intcnt);
                        wintcnt=intcnt;
                        outpw(WDBASE+0, paraCount );  /* Timeout Register */
                }
        }
        printf("¥n¥n");
        ResVect();                                          /* restore vector */
        outpw(WDBASE+0, 0 );          /* WATCHDOG Timeout Register stop */
}
/* ------------------------------------------------------------ End of file --- */
```

Q&A

Q.Do you have a list of operating systems for which operation has been confirmed?

A.A list is posted on the CONTEC web site at http://www.contec.co.com/fit/. Please download the latest drivers from the web site. As documents including important notes on the use of the module are also posted on the web site, please visit the CONTEC web site before using the module.

Q.The product enclosure will become hot. Is there any risk of it warping in the heat?

A.The enclosure uses fire-resistant plastic and can withstand temperatures up to 108°C without warping. Please ensure you use the device within the conditions specified in "Table 5.2 Installation Environment Conditions".

Q.Which brands of CompactFlash can I use?

A.The requirement is that the CompactFlash supports True IDE mode. As some low price brands of CompactFlash do not support True IDE mode, please check with the manufacturer or agent before purchasing. CONTEC recommends you use CompactFlash made by Transcend Corporation.

Q.How can I install an OS in a CompactFlash card?

A.You can use the CONTEC DTK-SB20(FIT)GY to provide an environment equivalent to that provided by a general PC, in which you can install an operating system using a CD-ROM or FD and a hard disk.
Otherwise, you can use a USB-based CD-ROM drive or FDD to install an OS.
For details, see “USB port” in Chapter 3 or visit the CONTEC web site to see “CPU-SBxx(FIT)GY OS installation procedure”.

Q.Can I use a bootable CompactFlash created on a different PC?

A.The setting required for disk access (the BIOS parameter block) differ depending on the BIOS manufacturer and these are written to the CompactFlash when it is formatted. For this reason, you cannot typically use a CompactFlash from another PC.

Q.Can I use a power supply other than the CONTEC power supply?

A.You can use a power supply from another manufacturer but ensure that it provides 5VDC+/-5% with 1.5A capacity. When determining the wiring layout, refer to the "Connection Procedure" in Chapter 2 and take note of the cable size and length restrictions for both the power supply and other cables. When connecting F&eIT series devices, a power supply with a capacity of "1.5A + F&eIT series device current consumption" is required.

Q.What do I do if a connected USB device does not work correctly?

A.The USB controller on the module complies with OHCI Version 1.0. However, some USB devices do not work correctly with an OHCI controller.

Q.Why does "PCI Bridge" appear with two question marks in Windows Device Manager?

A.This appears as a result of the CPU configuration but has no effect on the operation. No driver is required.

Q.I have lost my PS/2 divided cable. Can I use a standard cable purchased from a local retailer?

A.No. Most cables sold in retail stores are intended for use with notebook PCs and have different wiring connections. Instead, please contact CONTEC. If you wish to use a keyboard only, you do not need to use the divided cable and you can use the connector as a dedicated keyboard connector.

Q.It returns to default being cleared the content set by CMOS.

A.When power supply OFF is continuously repeated three times or more while displaying the splash screen of the start, the setting of CMOS is cleared. This is a function (specification) that has it as an evasion plan when the setting of CMOS is set by mistake and it falls into the state that cannot be started.

Q.The clock/calendar date was January 17, 2003 after the module was restarted?
I found the clock/calendar losing time badly. What's wrong?

A.Did you turn the power on soon after turning it off? Set the clock/calendar again, turn the power off, wait for at least five seconds, then turn the power back on.
If the clock/calendar returns to January 17, 2003 even after you set it correctly, the on-board battery seems to have run out. Please contact your retailer.

CPU-SB22/256(FIT)
CPU-SB21/256(FIT)GY
CPU-SB20/256(FIT)GY
CPU-SB20/128(FIT)GY
User's Manual

CONTEC CO.,LTD.
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